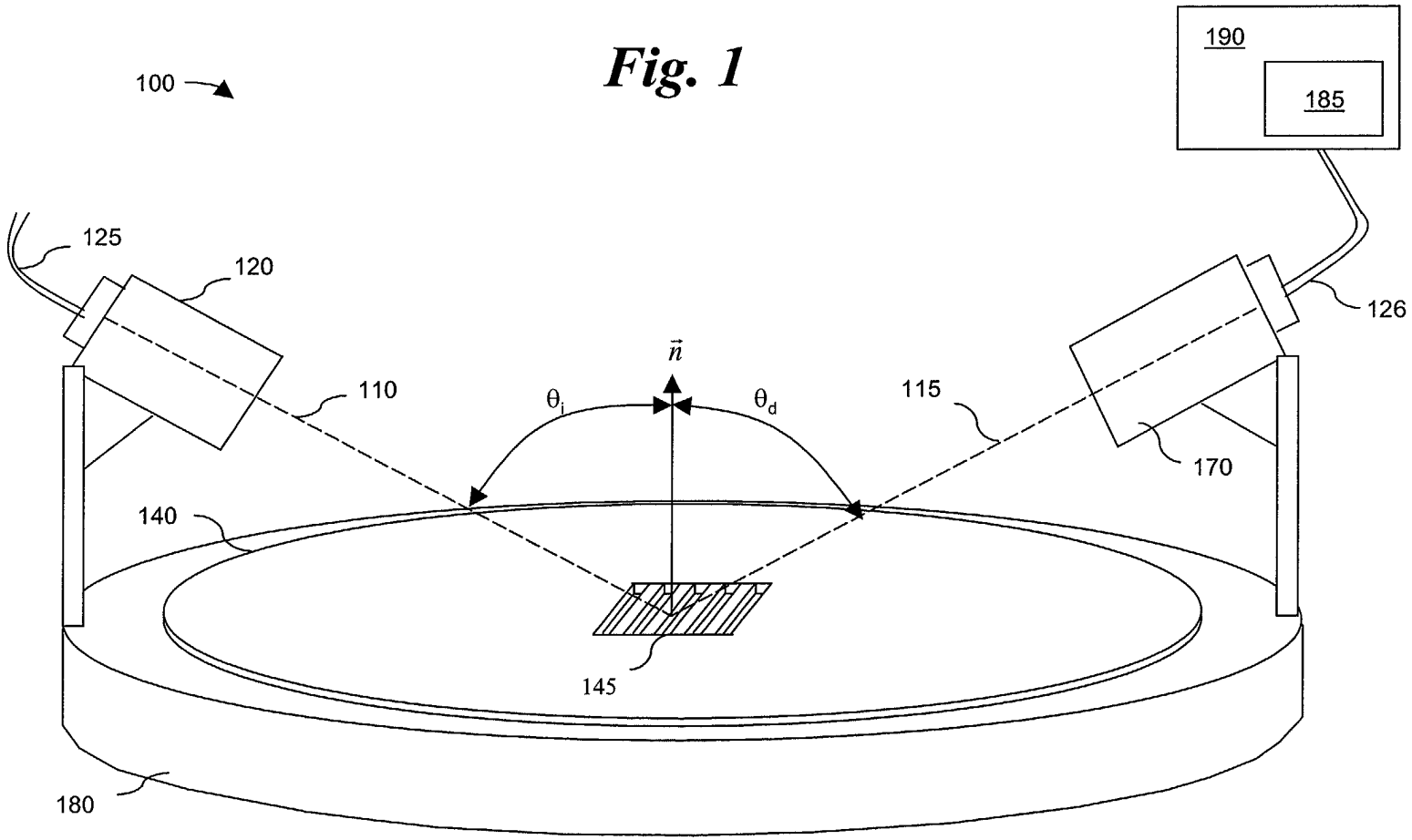
20070 Patent

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor :Xinhui NIU and Nickhil JAKATDAR
Application No.. To Be Assigned
Docket No . 509982001200

Fig. 1



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Inventor: Xinhui NIU and Nickhil JAKATDAR
Application No : To Be Assigned
Docket No : 509982001200
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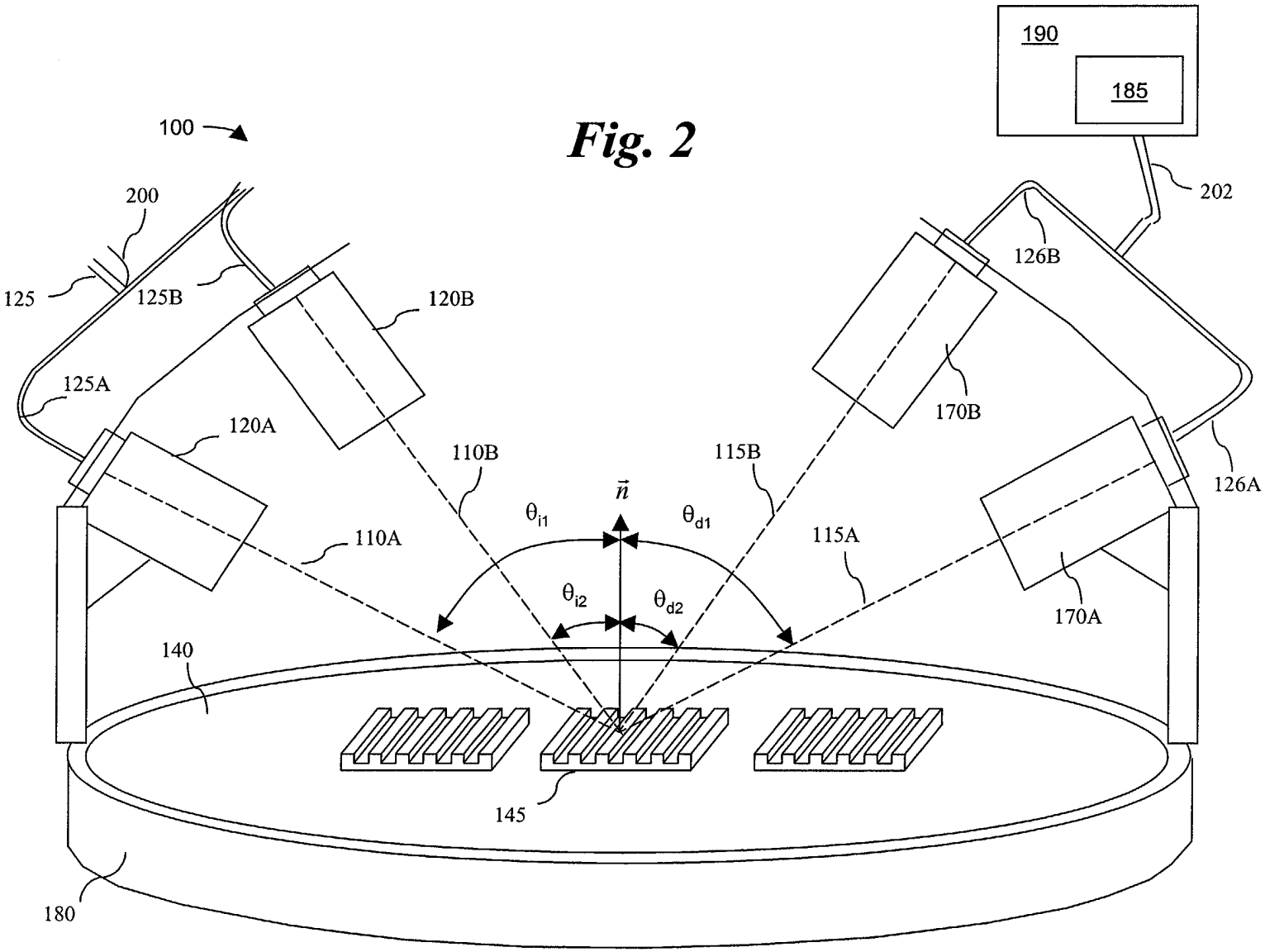

Fig. 2

20970 DEGSOOT

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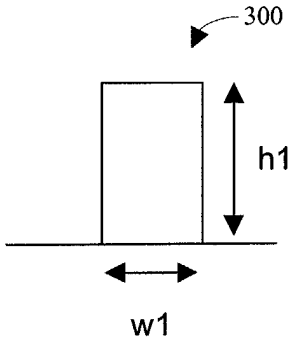

Fig. 3A

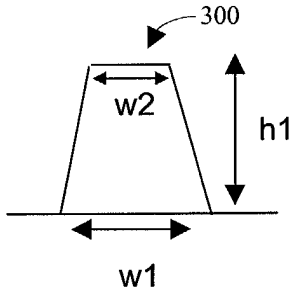

Fig. 3B

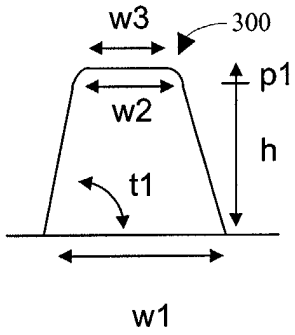

Fig. 3C

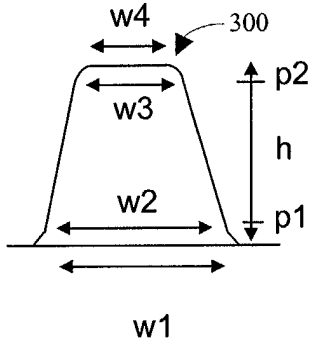

Fig. 3D

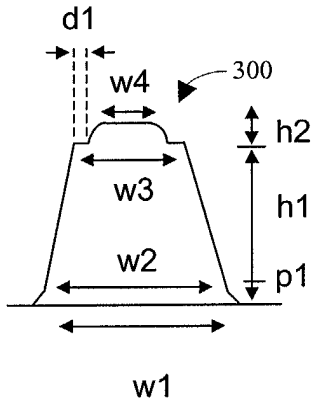

Fig. 3E

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor. Xinhui NIU and Nickhil JAKATDAR
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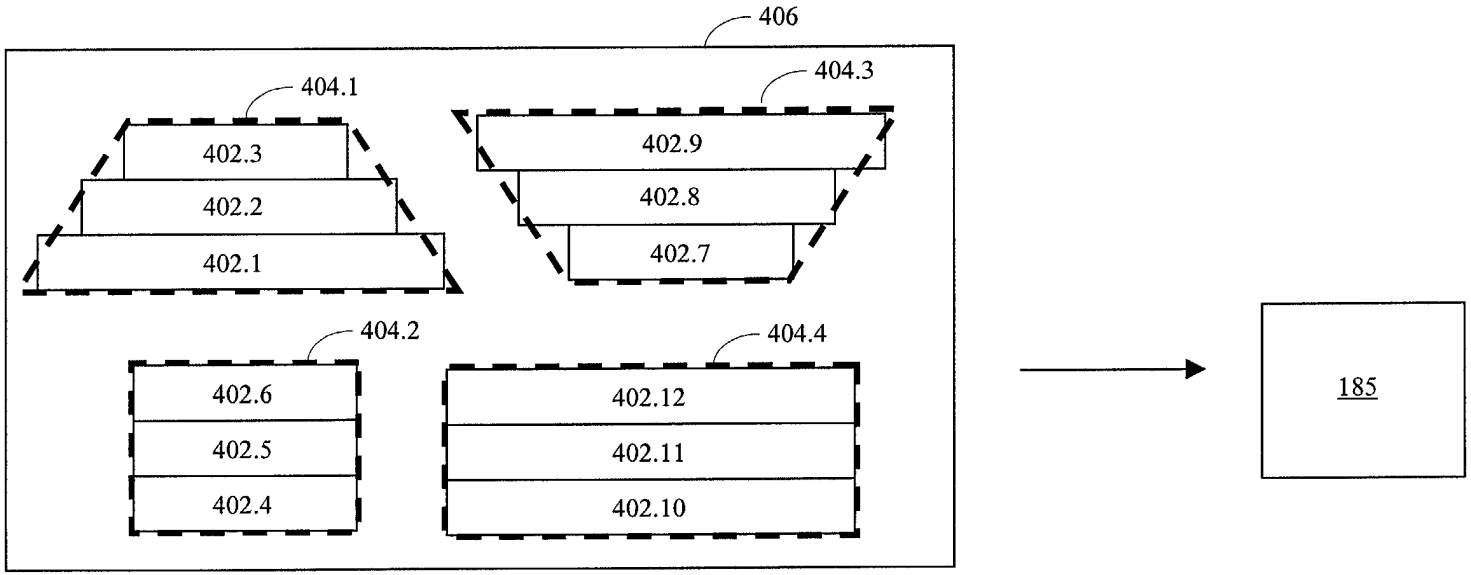

Fig. 4

20070-0818S001

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Inventor Xinhui NIU and Nickhil JAKATDAR
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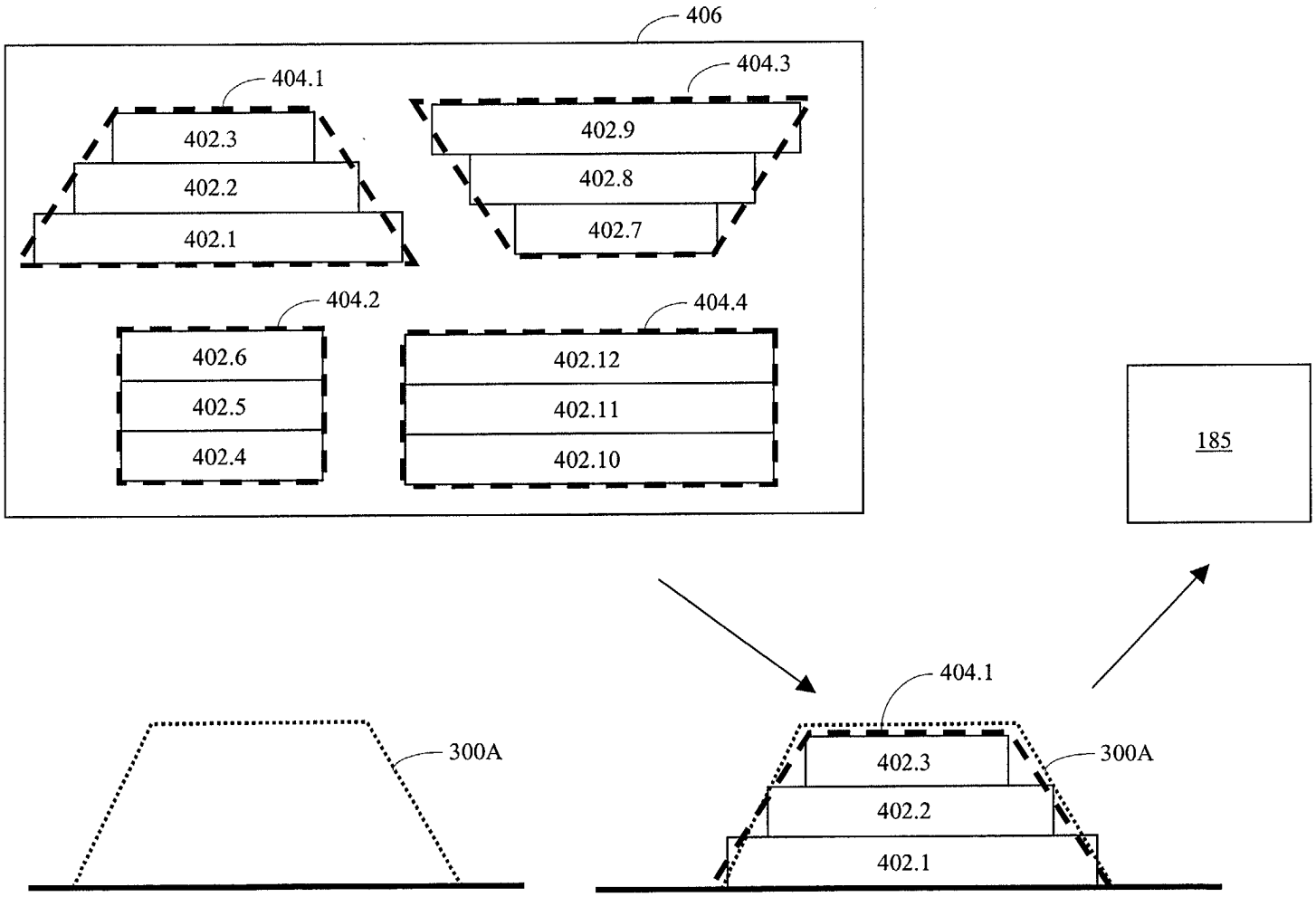

Fig. 5A

20370 "0E8T5007

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Inventor: Xinhui NIU and Nickhil JAKATDAR
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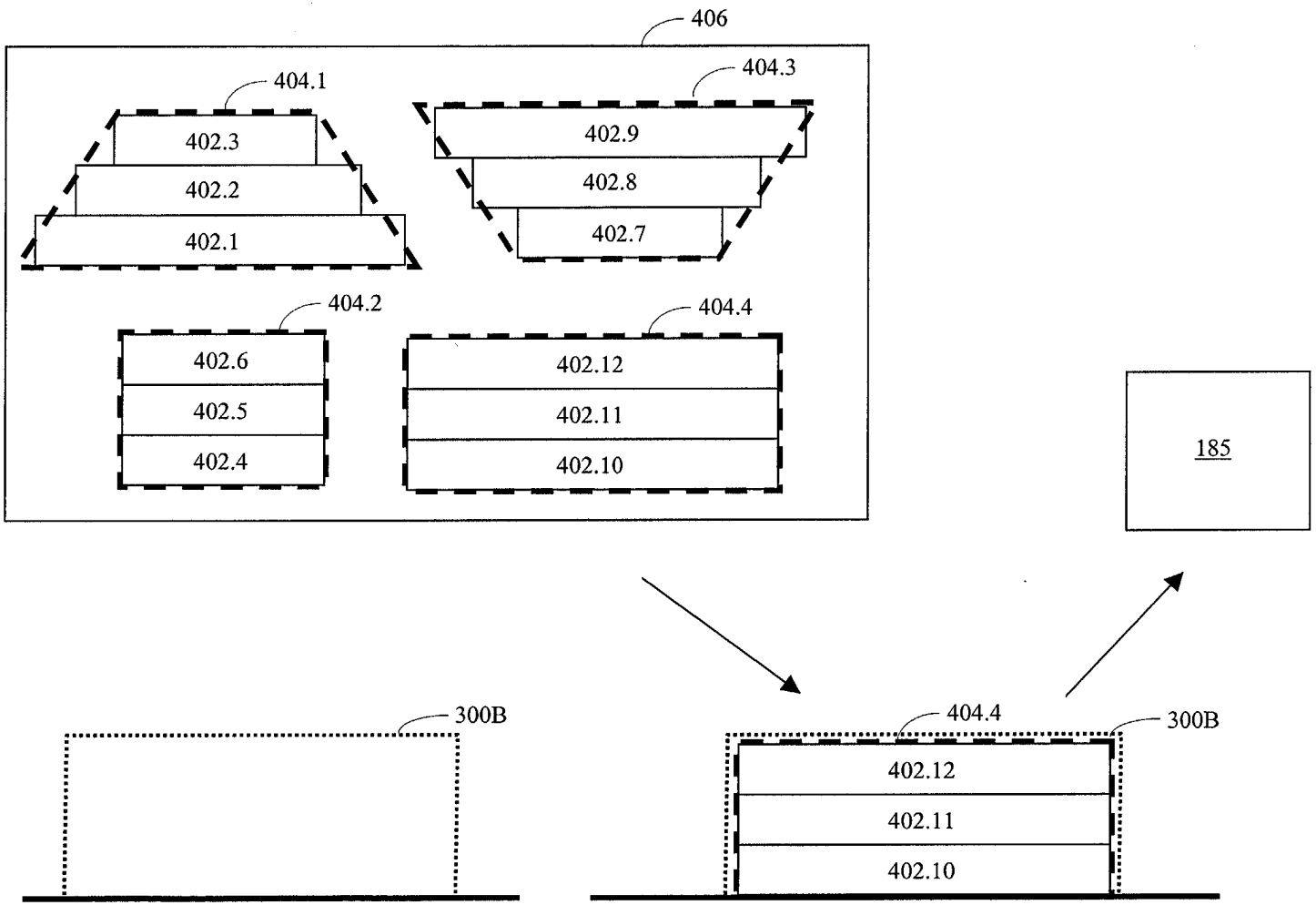

Fig. 5B

20070 "DEBTSOOT

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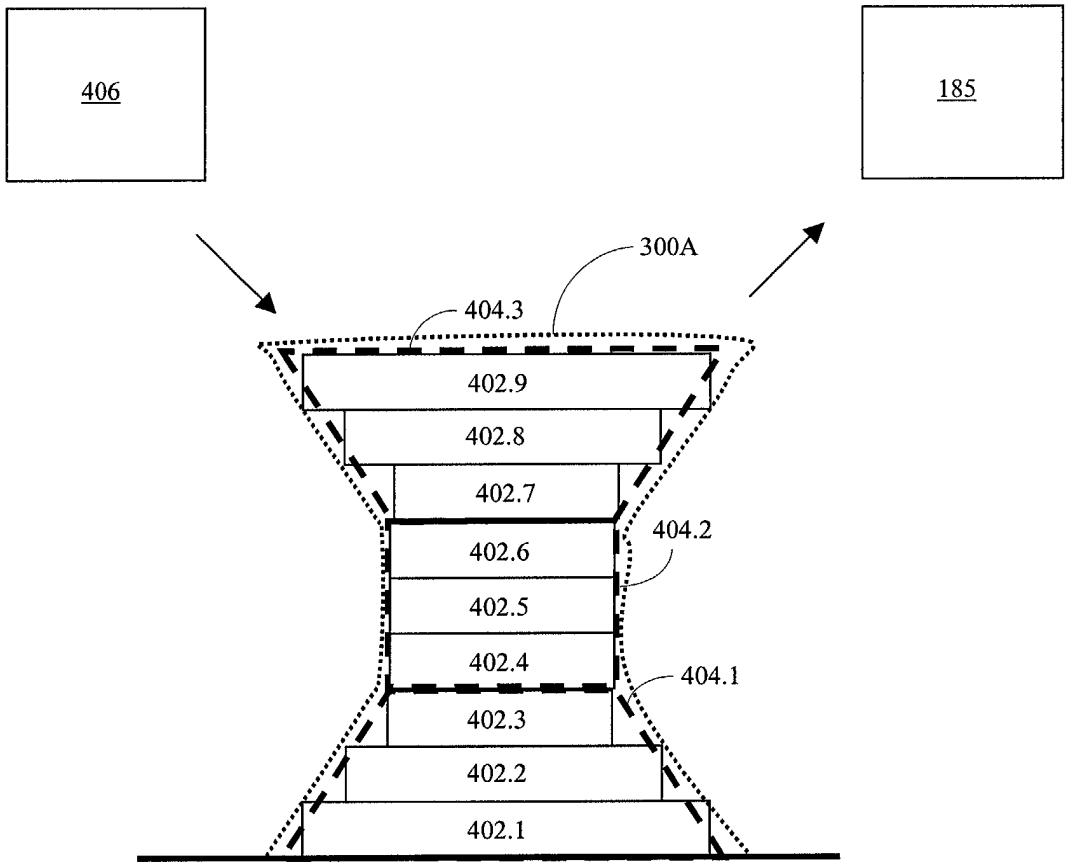

Fig. 6A

209TFO" 0E8F5001

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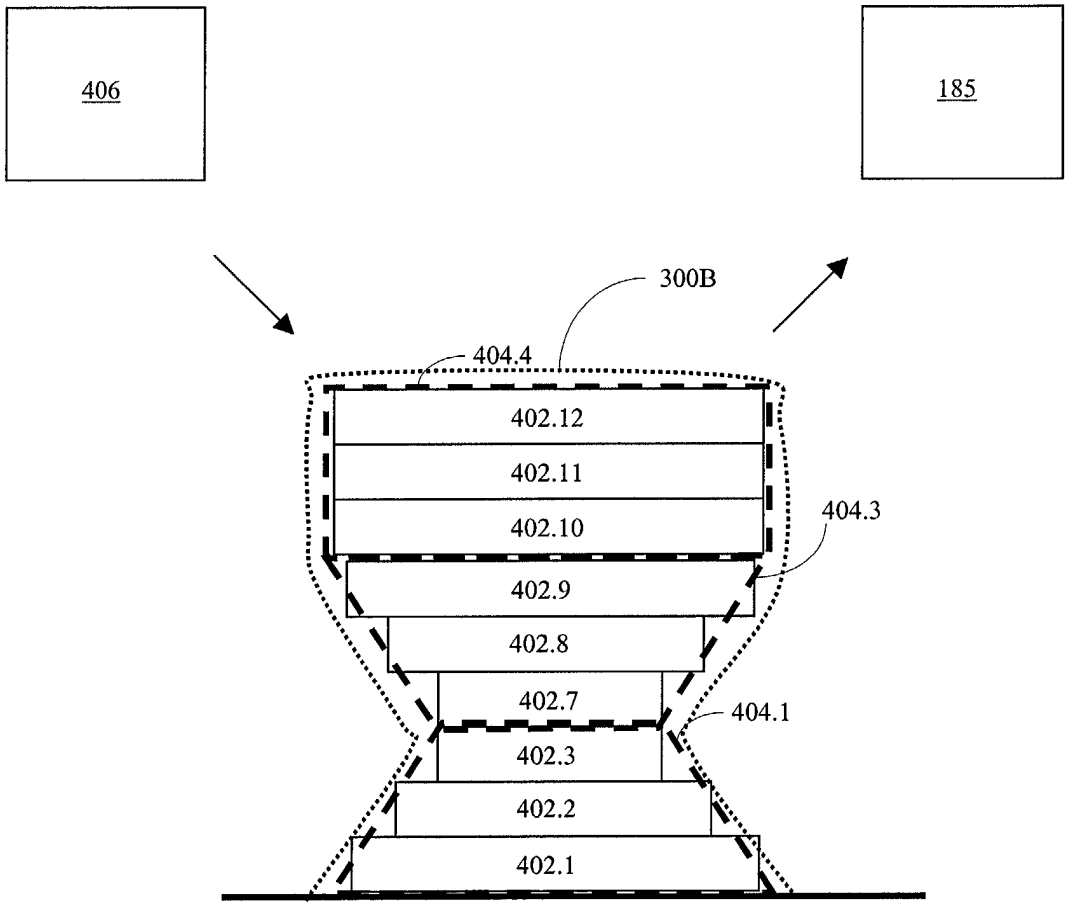


Fig. 6B

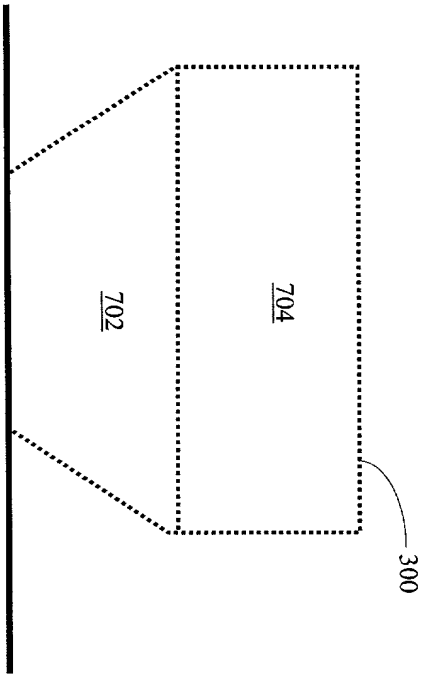
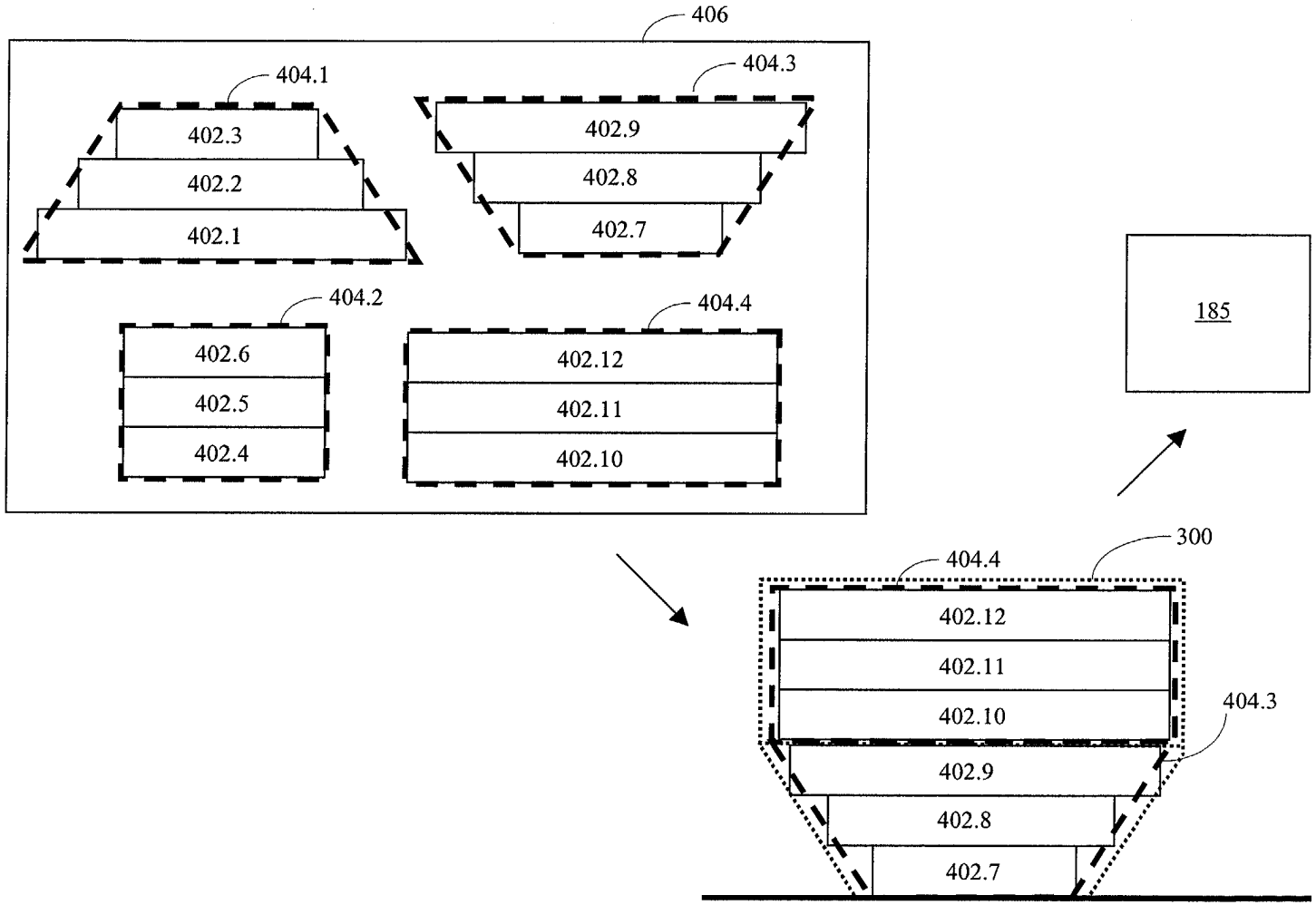


Fig. 7A


406
404.1
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402.2
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402.7

Fig. 7B

USPTO PATENT

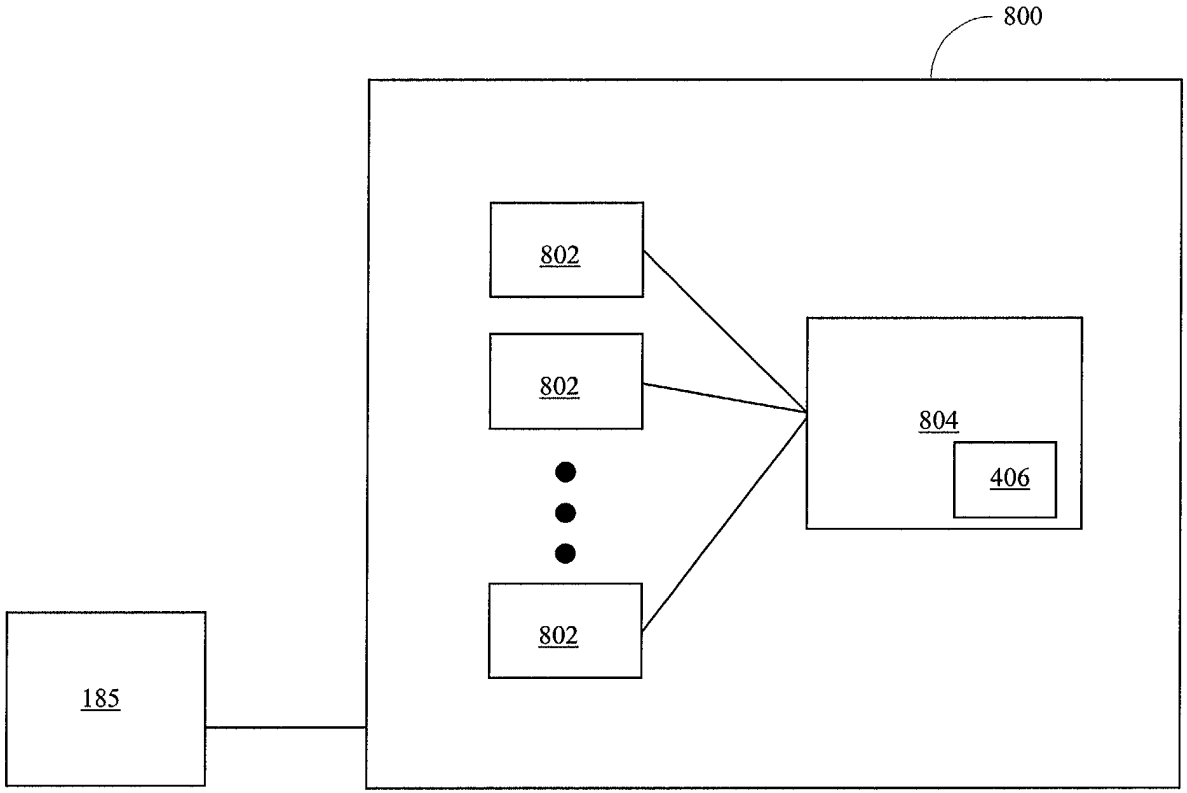

Fig. 8

20070 DEBTSOOT

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor. Xinhui NIU and Nickhil JAKATDAR
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Docket No · 50998200200

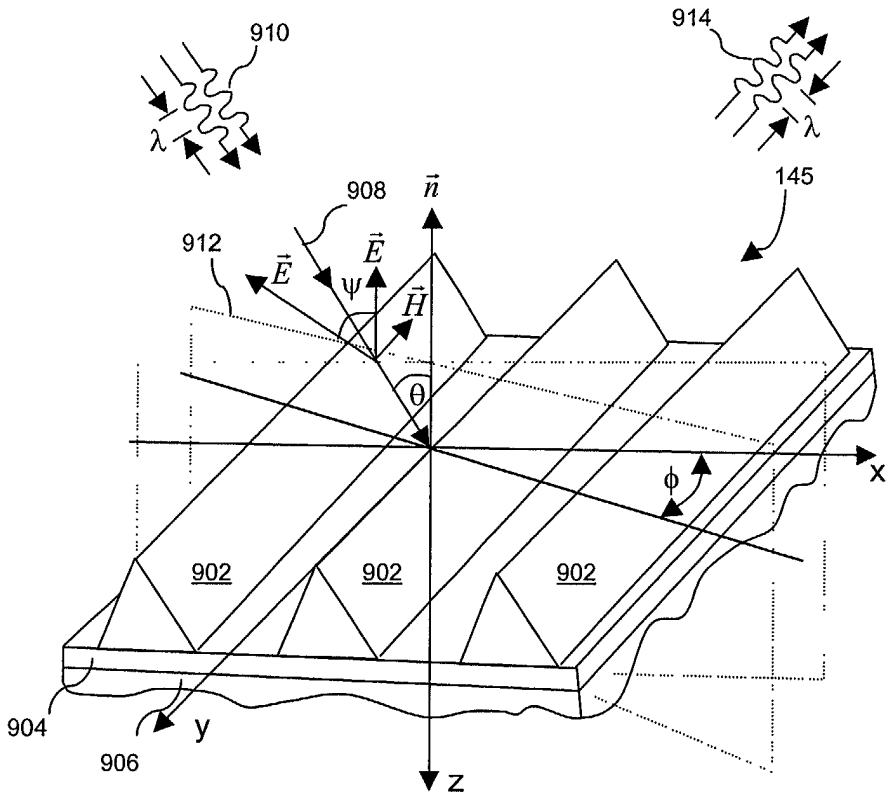

Fig. 9

2097TO" 0E8F5007

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor. Xinhui NIU and Nickhil JAKATDAR
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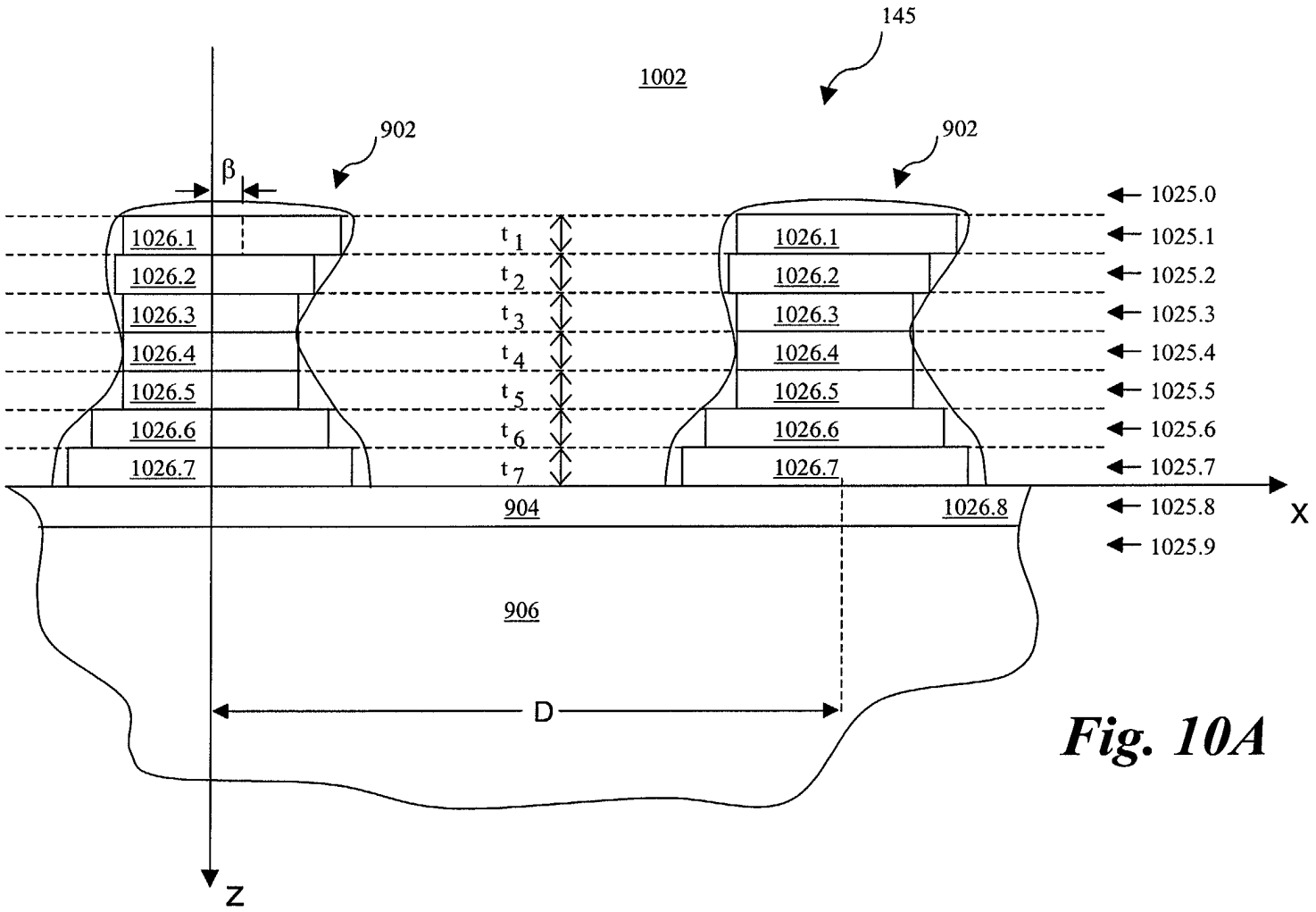

Fig. 10A

20070 08875007

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor: Xinhui NIU and Nickhil JAKATDAR
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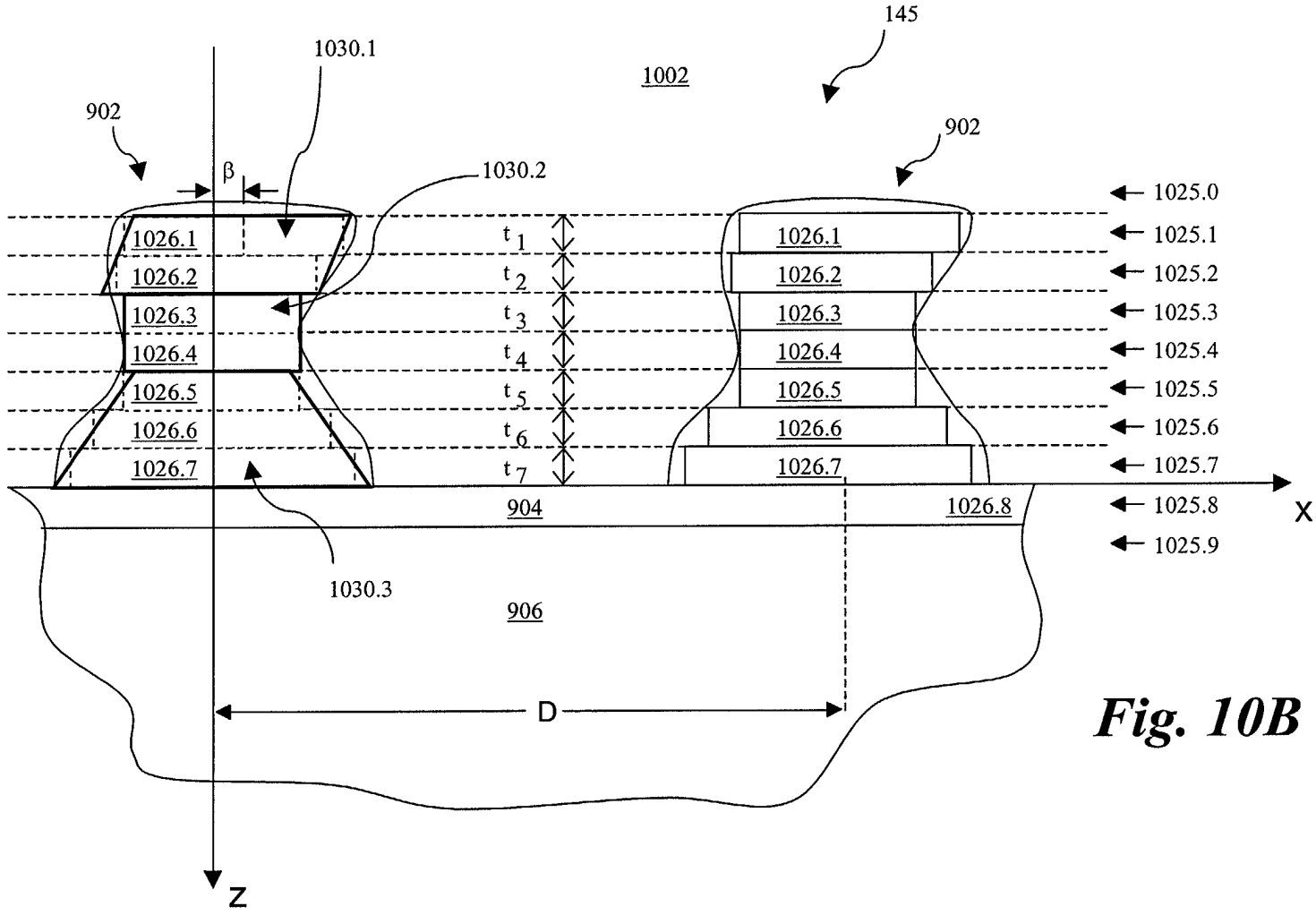

Fig. 10B

20070 0681502

Title: GENERATING A LIBRARY OF SIMULATED-DIFFRACTION SIGNALS AND HYPOTHETICAL PROFILES OF PERIODIC GRATINGS
Inventor: Xinhui NIU and Nickhil JAKATDAR
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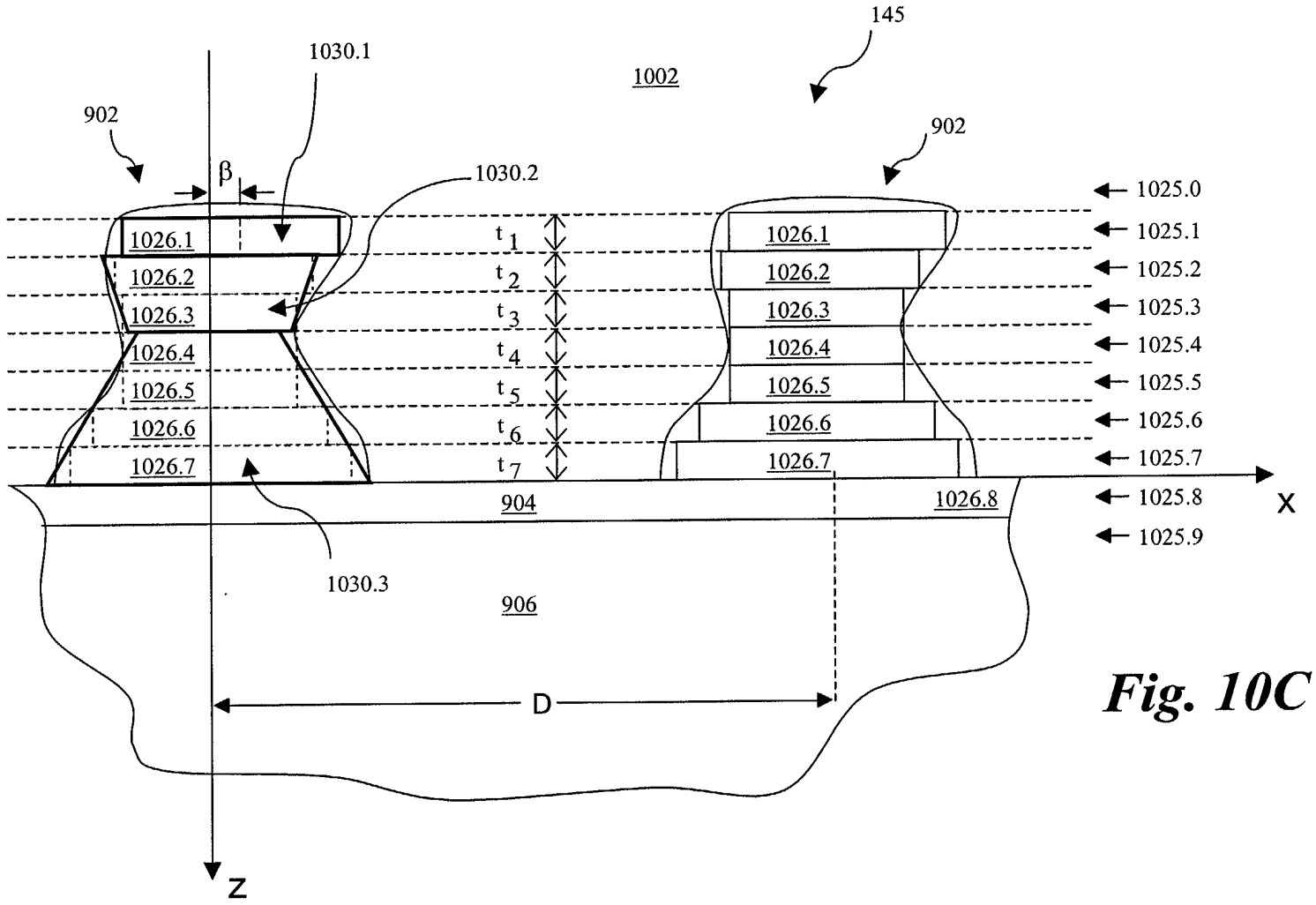

Fig. 10C

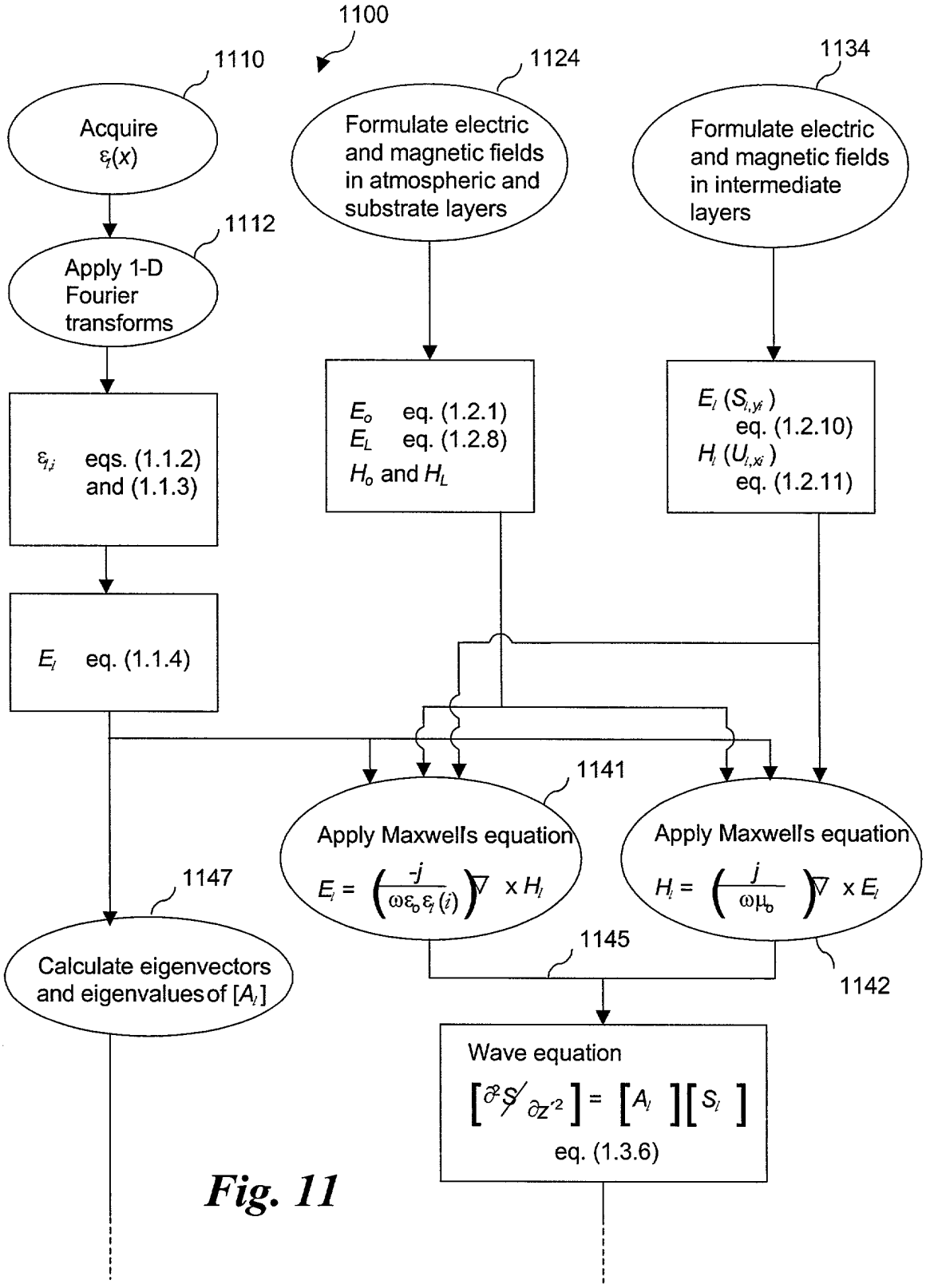
1100
1110
Acquire $\varepsilon_f(x)$
1112
Apply 1-D Fourier transforms
$\varepsilon_{f,i}$ eqs. (1.1.2) and (1.1.3)
E_f eq. (1.1.4)
1124
Formulate electric and magnetic fields in atmospheric and substrate layers
E_o eq. (1.2.1)
E_L eq. (1.2.8)
H_o and H_L
1134
Formulate electric and magnetic fields in intermediate layers
E_f ($S_{i,yf}$) eq. (1.2.10)
H_f ($U_{i,xi}$) eq. (1.2.11)
1141
Apply Maxwell's equation
$E_i = \left(\frac{-j}{\omega\varepsilon_o\varepsilon_f(i)}\right)\nabla \times H_i$
Apply Maxwell's equation
$H_i = \left(\frac{j}{\omega\mu_o}\right)\nabla \times E_i$
1142
1145
1147
Calculate eigenvectors and eigenvalues of $[A_i]$
Wave equation
$\left[\partial^2 S / \partial z^2\right] = [A_i][S_i]$
eq. (1.3.6)

Fig. 11

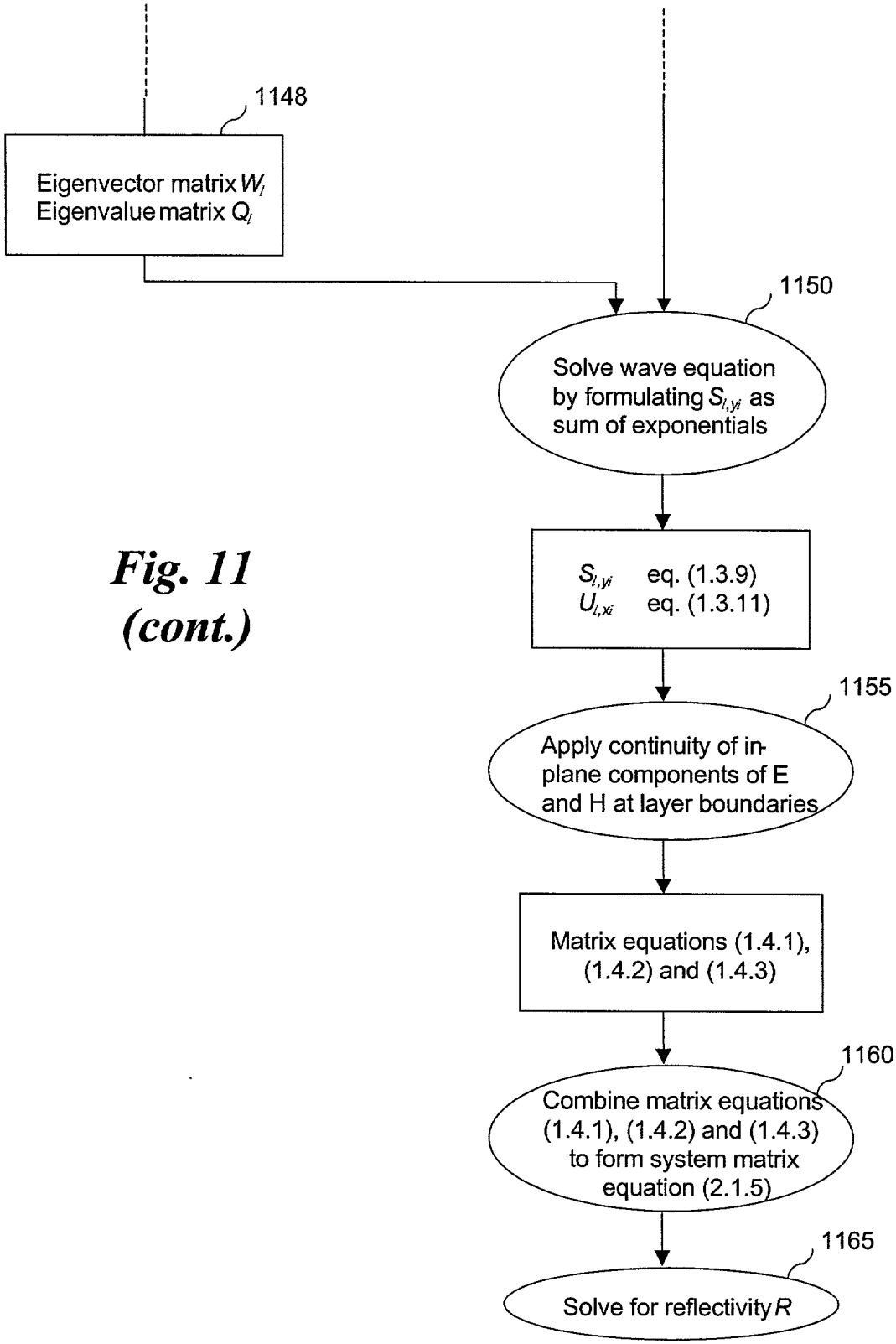

Fig. 11 (cont.)

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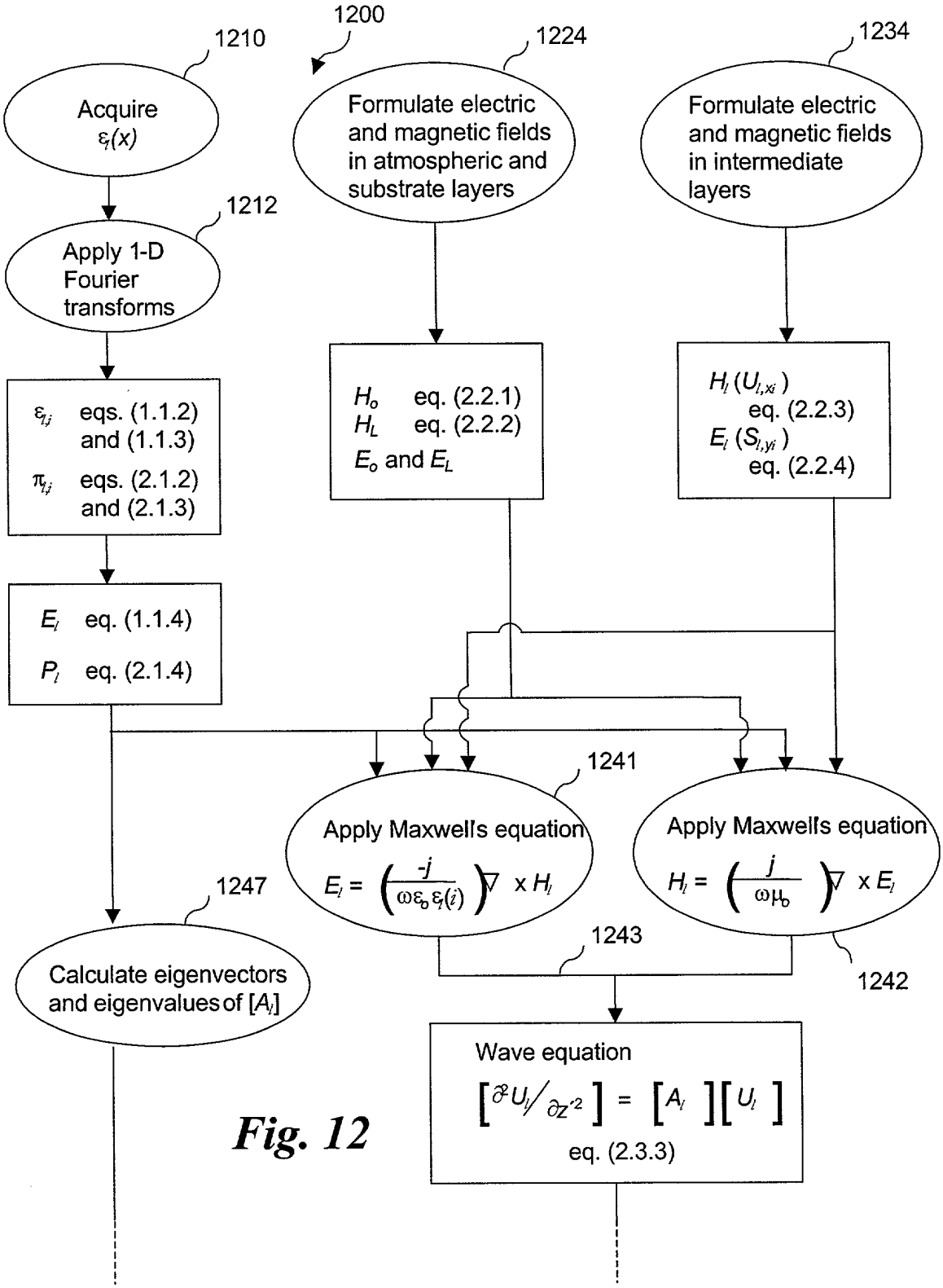
1200
1210
Acquire $\varepsilon_l(x)$
1212
Apply 1-D Fourier transforms
$\varepsilon_{l,j}$ eqs. (1.1.2) and (1.1.3)
$\pi_{l,j}$ eqs. (2.1.2) and (2.1.3)
E_l eq. (1.1.4)
P_l eq. (2.1.4)
1224
Formulate electric and magnetic fields in atmospheric and substrate layers
H_o eq. (2.2.1)
H_L eq. (2.2.2)
E_o and E_L
1234
Formulate electric and magnetic fields in intermediate layers
$H_l(U_{l,xi})$ eq. (2.2.3)
$E_l(S_{l,yi})$ eq. (2.2.4)
1241
Apply Maxwell's equation
$E_l = \left(\frac{-j}{\omega\varepsilon_o\varepsilon_l(i)}\right)\nabla \times H_l$
Apply Maxwell's equation
$H_l = \left(\frac{j}{\omega\mu_o}\right)\nabla \times E_l$
1247
Calculate eigenvectors and eigenvalues of $[A_l]$
1243
1242
Wave equation
$\left[\partial^2 U_l / \partial z^2\right] = [A_l][U_l]$
eq. (2.3.3)

Fig. 12

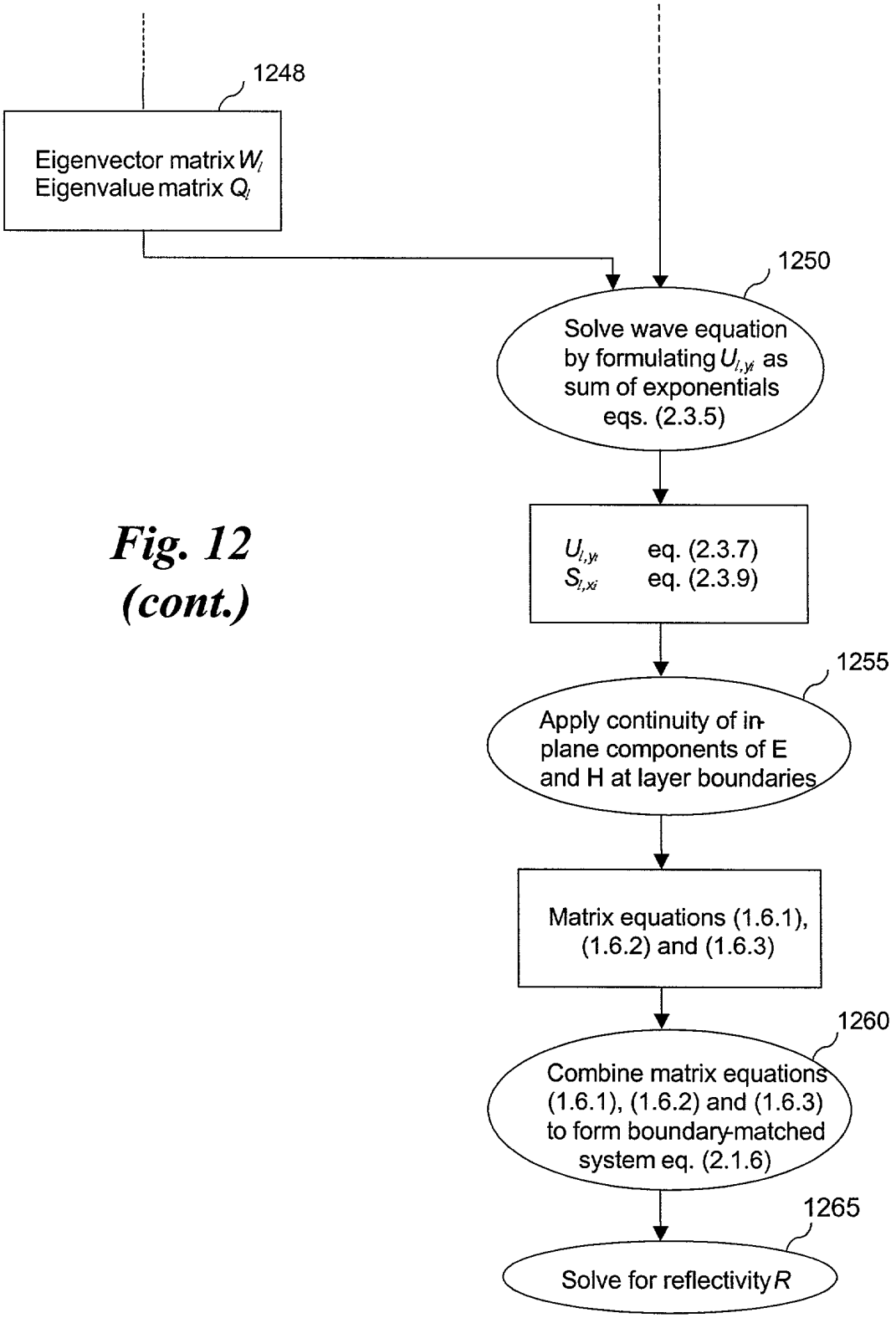

Fig. 12 (cont.)

APPLIED MATERIALS EXHIBIT 1002

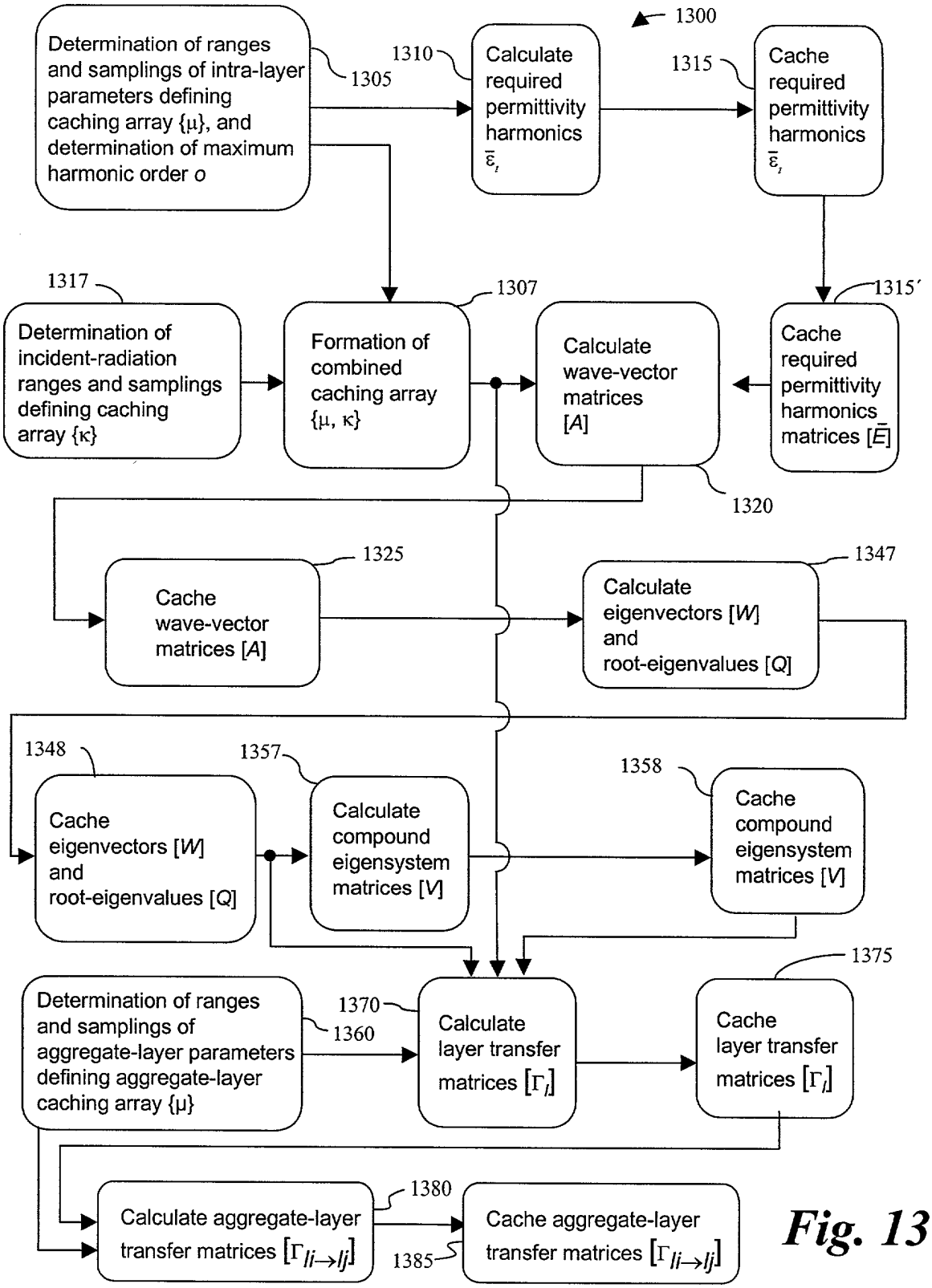
1300
Determination of ranges and samplings of intra-layer parameters defining caching array {μ}, and determination of maximum harmonic order o
1305
1310
Calculate required permittivity harmonics $\bar{\varepsilon}_t$
1315
Cache required permittivity harmonics $\bar{\varepsilon}_t$
1317
Determination of incident-radiation ranges and samplings defining caching array {κ}
1307
Formation of combined caching array {μ, κ}
Calculate wave-vector matrices [A]
1315'
Cache required permittivity harmonics matrices [$\bar{E}$]
1320
1325
Cache wave-vector matrices [A]
1347
Calculate eigenvectors [W] and root-eigenvalues [Q]
1348
Cache eigenvectors [W] and root-eigenvalues [Q]
1357
Calculate compound eigensystem matrices [V]
1358
Cache compound eigensystem matrices [V]
Determination of ranges and samplings of aggregate-layer parameters defining aggregate-layer caching array {μ}
1370
1360
Calculate layer transfer matrices [Γ_l]
1375
Cache layer transfer matrices [Γ_l]
Calculate aggregate-layer transfer matrices [$\Gamma_{li\to lj}$]
1380
1385
Cache aggregate-layer transfer matrices [$\Gamma_{li\to lj}$]

Fig. 13

Fig. 14

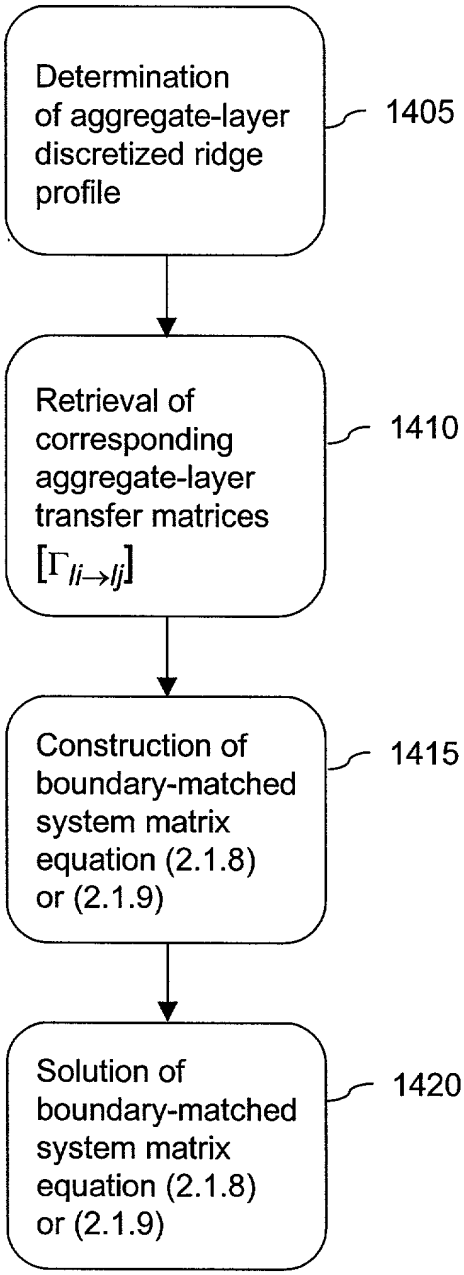

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Fig. 15

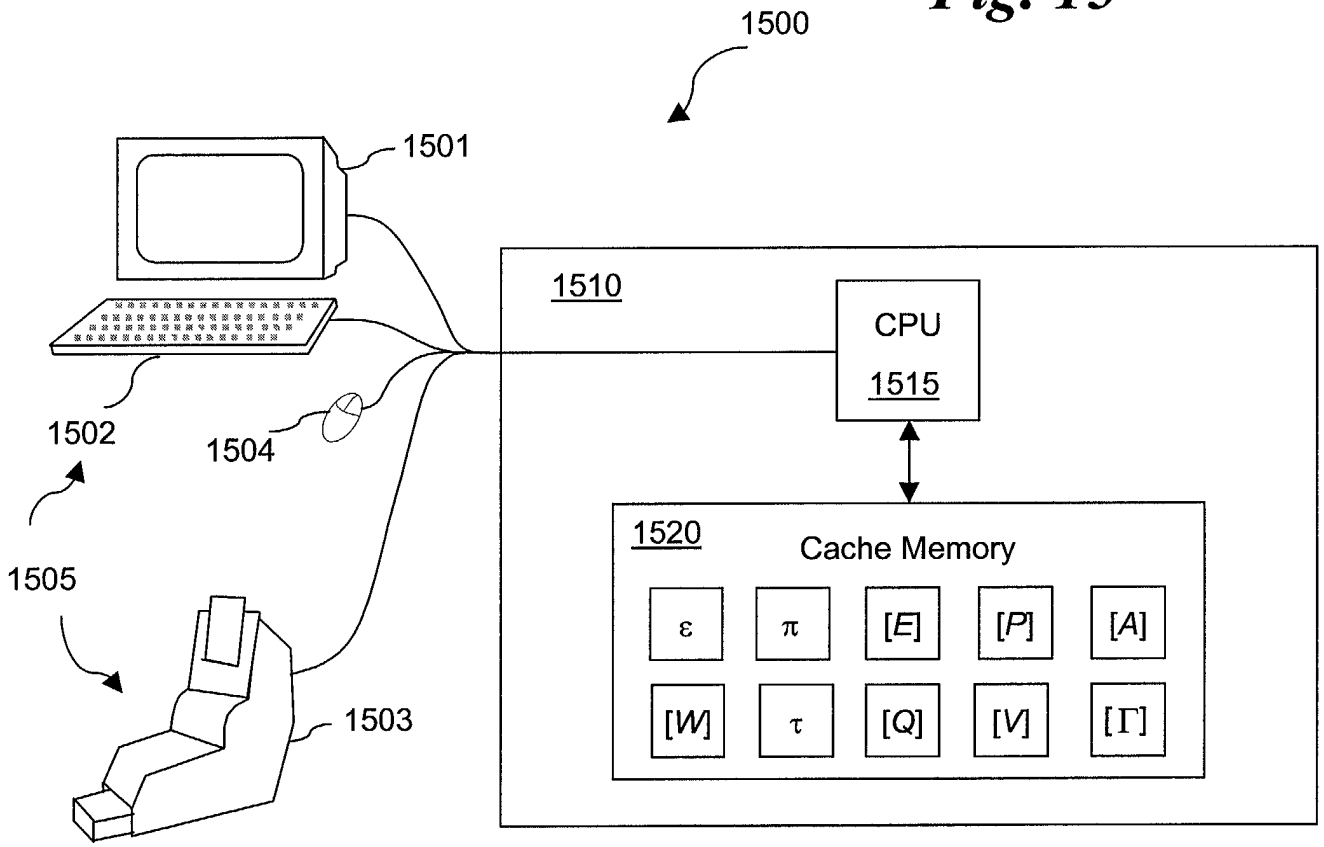

Fig. 16A

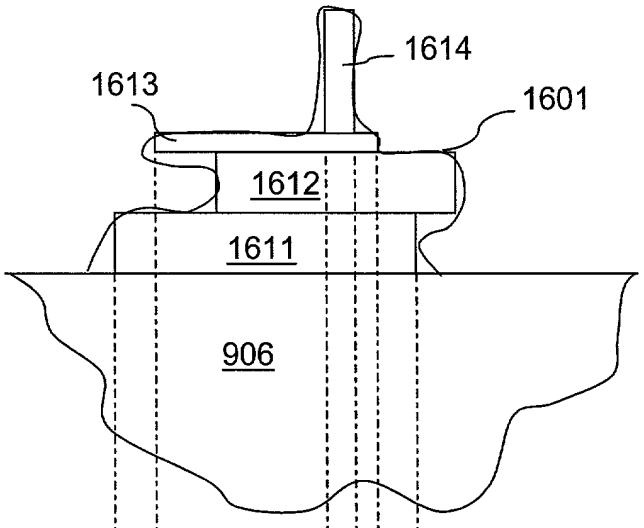

Fig. 16B

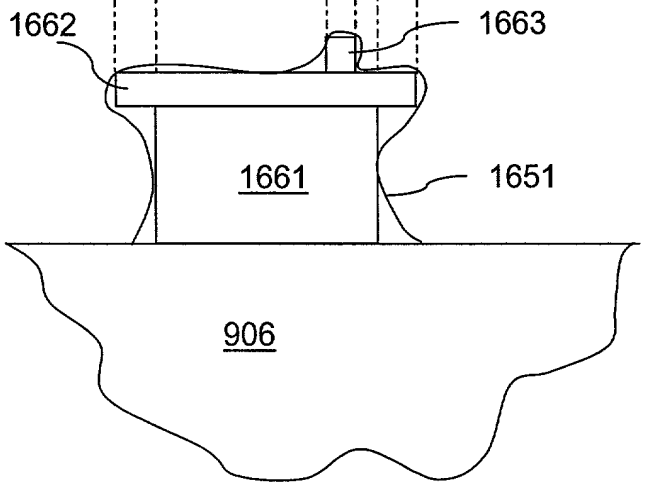

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Fig. 16C

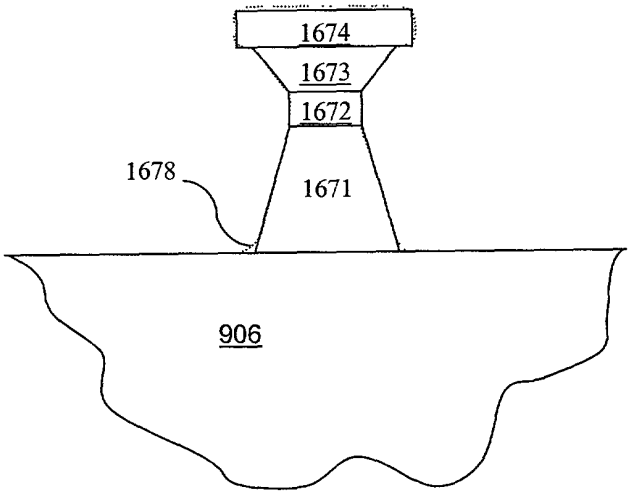

Fig. 16D

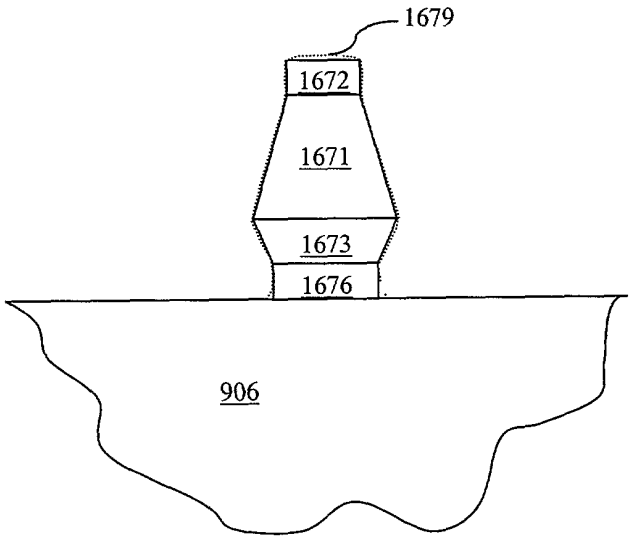

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Fig. 17

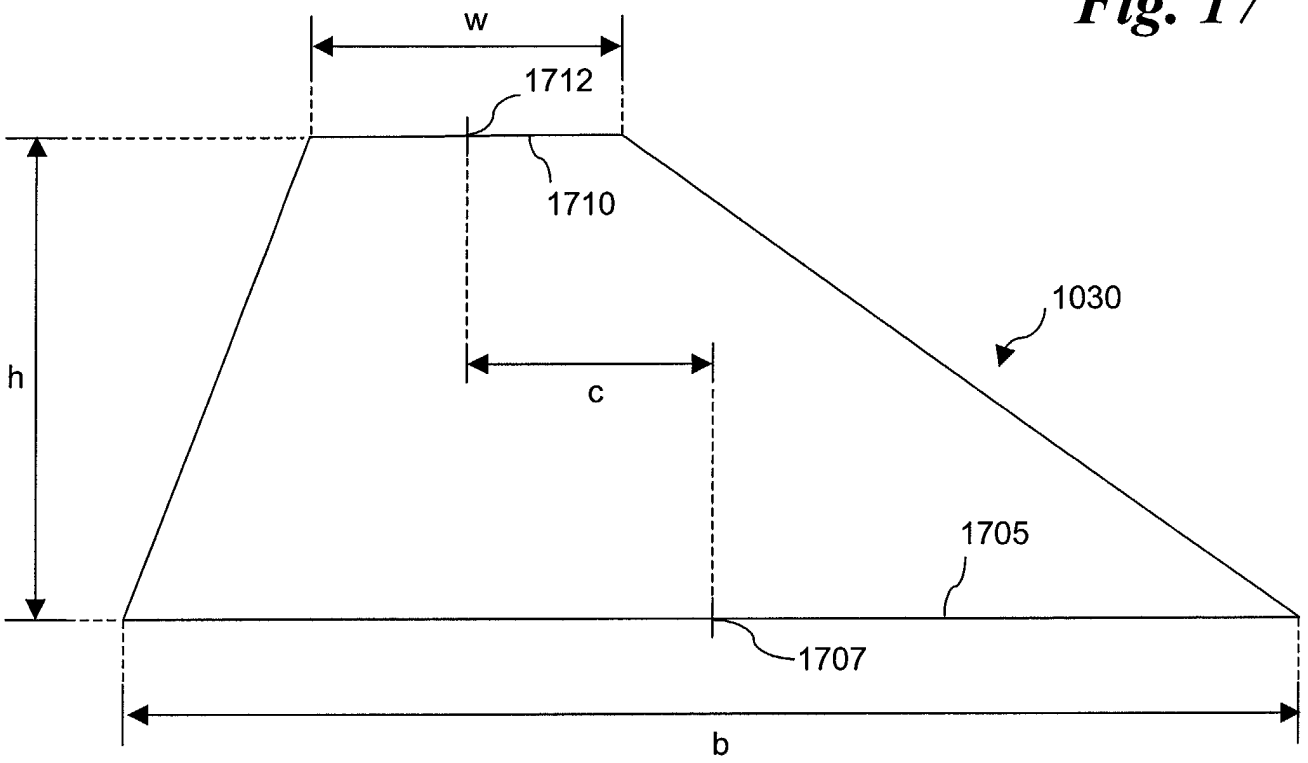

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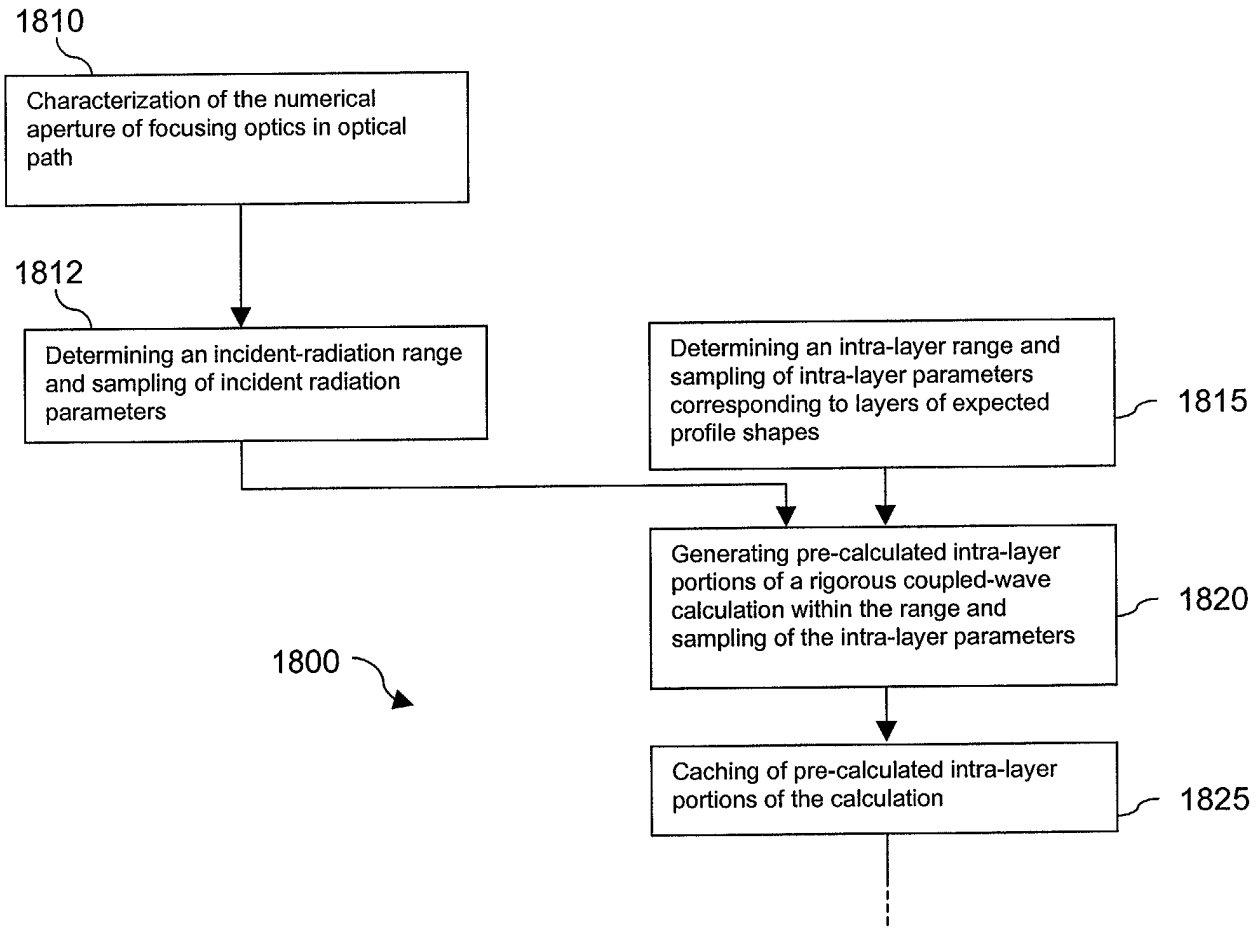
Fig. 18



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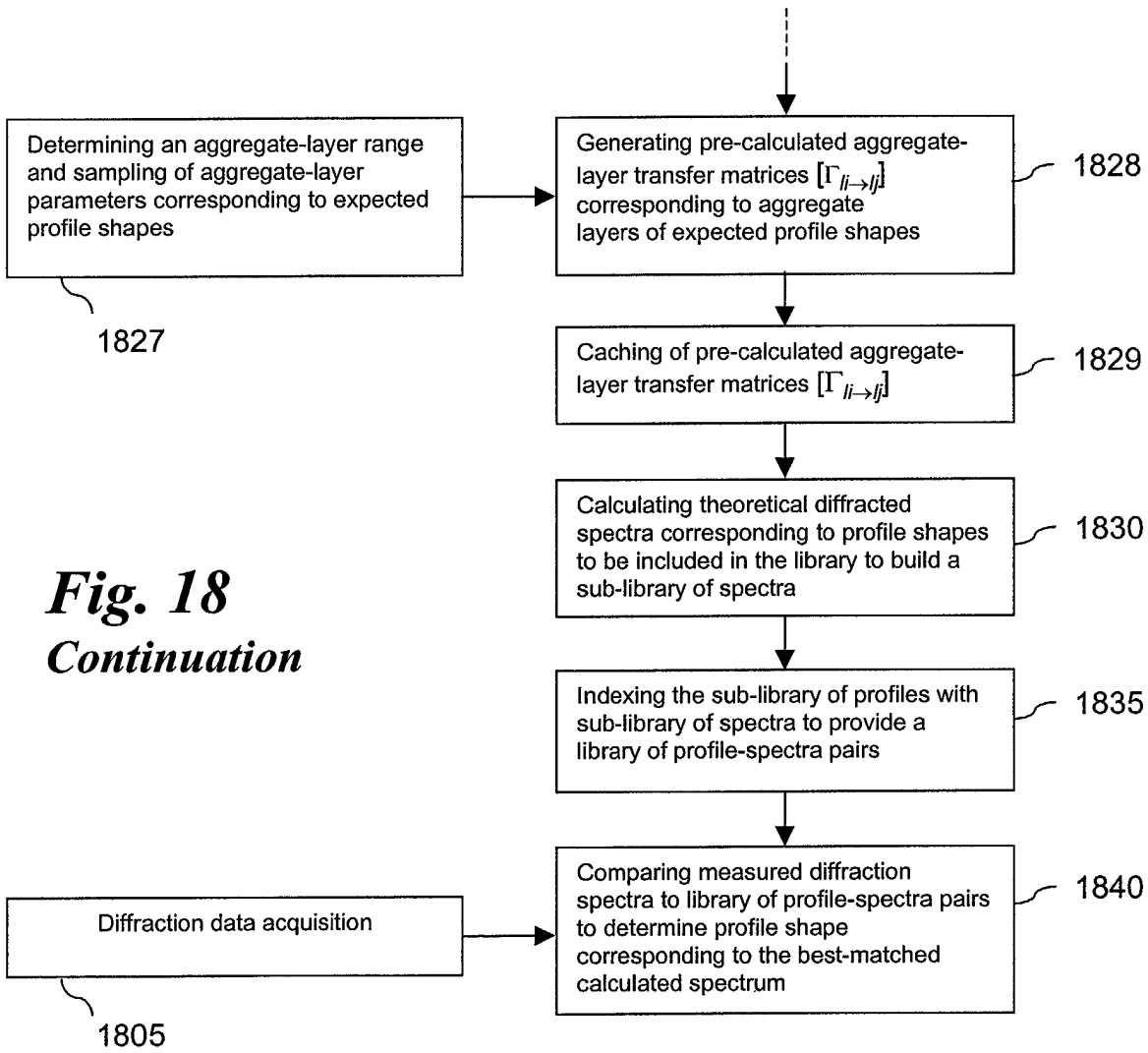

Fig. 18
Continuation